## III. REMARKS

In the Official Action, Claims 1, 6, 8, 9, 11, 18-21 and 23 were rejected under 35 U.S.C. 103 as being unpatentable over Hennessey (US 6,487,307) in view of DeYong (WO 99/16010), Herbert (US 5,352,329) and Kanno (US 6,069,971), Claims 2-5, 12 and 22 were rejected under 35 U.S.C. 103 as was claim 1 and further in view of Roy (US 6,118,540), Claim 7 was rejected under 35 U.S.C. 103 as was claim 1 and further in view of Juvinall (US 4,066,363) and Maeda (US 5,153,444), Claim 10 was rejected under 35 U.S.C. 103 as was claim 8 and further in view of Langley (US Pat. Pub. 2001/0012392), Claims 13 and 14 were rejected under 35 U.S.C. 103 as was claim 11 and further in view of Lemmers (US 4,641,966), Claims 15 and 16 were rejected under 35 U.S.C. 103 as was claim 11 and further in view of Maeda, and Claim 17 was rejected under 35 U.S.C. 103 as was claim 11 and further in view of Juvinall for reasons set forth in the Action.

These grounds of rejection are substantially the same as the grounds of rejection raised in the prior Office Action.

Present Figs. 2, 3 and 4 show different embodiments of the present invention. The embodiment of Fig. 4 is distinguishable from the other embodiments in the use of a ratio of the number of pixels in a defined gray band (block 48) to the total number of pixels obtained in the captured illumination (block 44). Independent claims 1, 11 and 20, as submitted in the prior two responses, recited a ratio of the number of distinguishable pixels to the total number of pixels in the band, this subject matter finding support in the foregoing part of Fig. 4 and in the present specification on page 6 at lines 9-17. This

distinguishing feature of the invention has been argued in the previous response, but the argument was found to be unpersuasive by the examiner, as noted in Point 13 of the Action, because the limitation was not stated adequately in the claims.

In both the present and the previous rejections of claims 1, 6, 8, 9, 11, 18-21 and 23 under 35 U.S.C. 103, the examiner relies on Hennessey to show inspection of manufactured objects by use of an illumination source with an optical sensor to obtain gray level picture data, on DeYong for inspection of objects for defects with an optical system or method, on Herbert for the teaching of inspection of OPC devices for bottom edge wipe defects, and on Kanno to show a controller determining the ratio of distinguishable pixels to the total number of pixels by use of a threshold detector or discriminator plus a storage area, classification of results, and use of a monitoring device with a visual display.

It is urged that Kanno provides a teaching which is substantially different from that set forth in the present claims, and particularly with respect to the above-noted distinguishing feature of the present invention. As noted in the argument of the previous response, Kanno discloses, with reference to his Figs. 7 and 8, and with reference to the text in column 8 at line 11 through column 9 at line 23, that there is a pattern comparison inspection system employing pattern data for an electron beam patterning system file for storing pattern data, an occupancy calculating portion for calculating a ratio of a pattern occupying each pixel to each pixel (col. 8 at lines 24-38) from design pattern data, as well as a gray level bit map generating portion for generating a bit map in gray level from the ratio of design pattern data to each pixel obtained at

occupancy calculating portion. It is clear from Fig. 8 (and from the accompanying text, col. 8 at line 51 through col. 9 at line 23) that these signal processing steps are performed on a pixel-to-pixel basis.

In Kanno, there is no counting of pixels followed by determination of a ratio of pixels in a specific gray band to the total number of pixels in an illuminated portion of a device under test, such as the present device under test 10 (shown in present Fig. 1, and described in the aforementioned passage in the present specification on page 6 at lines 9-17).

It is emphasized that, contrary to the examiner's statement (bottom paragraph of Page 3 of the Office Action) that the ratio of Kanno would motivate one to combine the Kanno teaching with Hennessey, the Kanno ratio deals with the processing of a single pixel, and does not teach one how to judge an image of many pixels by taking a ratio of pixels in different gray-level bands. Therefore, there is no suggestion of the present invention.

This is understood from the Kanno treatment of an individual pixel as is shown in his Figs. 4 and 9. In both of these figures, for each pixel, a decision is to be made as to whether a pixel is to be regarded as being white (represented mathematically by a 0), or black (represented mathematically by a 1) as shown in the matrices of Fig. 4, or by a decimal fraction for an intermediary amount of black as shown in the matrices of Fig. 9. These matrices are developed by placing a bit map on an individual pixel in order to analyze the design pattern data 108, 109 (col. 9 at lines 28-38), thereby to classify the pixel in terms of a gray scale.

This is in contrast to the last paragraph of present claim 1 which discloses a controller for determining a ratio of the number of distinguishable pixels to the total number of pixels in a band, and wherein, based on the ratio, a threshold detector senses bottom edge wipe in an OPC device. In other words, the present invention deals with a population of whole pixels, while the foregoing process of Kanno is directed to a quantization of an amount of gray within a single pixel. As already noted above, the examiner found this argument to be non-persuasive because the claim did not call for "a population of whole pixels". It is urged that when one counts pixels and forms a ratio of numbers of pixels, the person must be dealing with whole pixels in the same manner as when a person counts apples, this being in accordance with the normal usage of language.

In order to meet the point raised by the examiner that whole pixels are not set forth in the claims, the independent claims have been amended to recite picture data of a plurality of distinguishable pixels. This finds support in the present specification on page 6, at line 13, wherein an example of fifty pixels is given. A plurality of pixels relates to whole pixels, rather than the analysis of a single pixel as done in Kanno. It is urged that this amendment does not raise any new issues because, in the normal usage of language, the text of the claims covered the situation wherein whole pixels are being considered. Accordingly, the examiner must have searched the art dealing with finding a ratio of a first number of pixels (whole pixels) divided by a second number of pixels.

Thus, it is clear that the teaching of Kanno is directed to a characterization of a pixel as being white, black, or gray.

However, in the practice of the present invention, one deals with a large number of pixels in a band of pixels representing an image of an edge of an organic photo conductor (OPC) device to determine if there be present a bottom edge wipe (BEW) defect. One is concerned with the number of dark pixels compared to the total number of pixels under consideration (present specification on page 6 at lines 12-13), wherein dark areas of the bottom edge portion of the OPC device due to BEW residue correspond to dark pixels (line 7) while lighter areas of the bottom edge portion correspond to lighter pixels (lines 8-9). There is nothing in the Kanno teaching which would suggest to one skilled in the art just how to interpret an image of BEW residue, in particular, because the present invention provides an analysis of a large number of pixels representing different portions of an image of an edge region of an OPC device, while Kanno deals with a quantization (in the manner of an analog to digital converter) of the amount of gray in a single pixel located on an edge line between a light region and a dark region of an image.

In the rejection based on multiple references, the examiner attempts to match various aspects of the invention to technological procedures taught in respective ones of the cited references. The examiner then concludes that, since the invention employs known technological procedures, the invention must be obvious. However, as noted above, Kanno does not process multiple pixels of an image to gain an understanding of information presented by the image, but shows how to analyze a single pixel in order to characterize it in a numerical fashion, in particular, by a numerical indication of gray scale.

Furthermore, it is believed that, even if Kanno did evaluate an image composed of multiple pixels, there is no teaching that such a process would be useful in an evaluation of BEW. The examiner relies on Herbert to teach inspection of OPC devices for BEW defects. However, a review of the Herbert reference shows discussion of methods of application of a coating and methods of removal of a coating, but no methods of inspection of the surface to evaluate a BEW defect. Therefore, there would be no motivation to combine either Kanno or Herbert with the other references or with each other to show obviousness of the present invention.

It is presumed that an image of a BEW defect, as provided by an optical sensor, has specific characteristics which distinguish the image from other images, and that the BEW-defect image is analyzed best by a specific form of analysis. The finding of a suitable procedure for such analysis is a major feature of the present invention. Of the numerous methods of image analysis that are known, there is no teaching in the cited art of how one should analyze the image of a BEW defect. Accordingly, it is urged that the combination of the cited references would not lead one to the practice of the present invention.

As has been explained in previous responses, a feature of the present invention deals with the mode of analyzing data obtained from observation of the OPC device during a stage of the manufacture in order to determine that the device is acceptable, and that the device is free of a defect. Observation is obtained by illuminating a bottom edge area of the OPC device, and by positioning an optical sensor to view the illuminated OPC bottom edge area, as is set forth in the claims. In accordance with the practice of the invention, the optical sensor provides a

band of captured illumination having gray level picture data of distinguishable pixels which are darker pixels or lighter pixels, as is disclosed on page 6 of the present specification. The decision process, for determining the acceptability of the OPC device, proceeds by determining a ratio of the number of distinguishable pixels to the total number of pixels in the band for classifying the OPC device. This feature of the invention is not disclosed nor suggested by the cited references, whether considered individually or in combination. Accordingly, the present argument is believed to overcome the rejections under 35 U.S.C. 103 so as to secure allowance of the foregoing claims 1, 6, 8, 9, 11, 18-21 and 23 as well as the other rejected claims.

With respect to the citation of Juvinall in the rejection of claim 7, the cited passage (column 8 at lines 22-25) makes reference to Fig. 5 which shows a single signal being applied to a set of comparators. This does not constitute an array of pixels.

Claims 16 and 23 are amended to conform to the amendatory passages of claims 11 and 20, respectively, and therefore present no new issues after the final rejection.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

Geza C. Ziegler, Jr.
Reg. No. 44,004

19 August 2003
Date

Perman & Green, LLP
425 Post Road
Fairfield, CT 06824
(203) 259-1800
Customer No.: 2512

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